WHAT IS CLAIMED IS:

1. An adsorbent for an arsenic species, wherein said adsorbent is an Fe- and Mn-oxide.

2. The adsorbent of claim 1, wherein said adsorbent is selected from the group consisting of Mn-ferrihydrite, Si-ferrihydrite, Si-free birnessite, Si-birnessite, and natural zeolite coated with nanophase Mn-Fe oxides.

3. The adsorbent of claim 2, wherein said adsorbent is a zeolite coated with nanophase Mn-Fe oxide.

4. The adsorbent of claim 3, wherein said adsorbent comprises from about 0.25% to about 10% Fe oxide with Mn/(Mn+Fe) molar ratio of 0.10.

5. The adsorbent of claim 4, wherein said adsorbent comprises 1% Fe oxide with Mn/(Mn+Fe) molar ratio of 0.10.

6. The adsorbent of claim 1, wherein said arsenic species comprises As(III) and As(V).

7. A method of producing a zeolite coated with nanophase Mn-Fe oxide, comprising the steps of:

(a) producing Fe oxide solution from a Fe-containing compound;

(b) adding a Mn-containing compound to the Fe oxide solution to obtain Fe-Mn solution;

(c) adding a zeolite to the Fe-Mn solution to form a mixture;

(d) filtering the mixture; and

(e) drying the filtered product, thereby producing a zeolite coated with nanophase

Mn-Fe oxide.

8. The method of claim 7, wherein said Fe-containing compound is $FeCl_3$.

9. The method of claim 7, wherein said Mn-containing compound is $MnCl_2$.

10. The method of claim 7, wherein said zeolite is either natural or synthetic.

11. The method of claim 7, before step (d), said method further comprising the steps of:

adjusting the pH of the mixture; and

equilibrating the mixture.

12. The method of claim 7, before step (e), said method further comprising the step of:

washing the filtered product with distilled water.

13. The method of claim 7, wherein the filtered product is air-dried or oven-dried.

14. A method of removing As(III) and As(V) from arsenic-contaminated waters, comprising the steps of:

(a) contacting the arsenic-contaminated waters with the adsorbent of claim 3, wherein Mn oxide in said adsorbent oxidizes As(III) to As(V); and

(b) removing the oxidized and native As(V) from said waters.

15. The method of claim 14, wherein the Mn oxide in said adsorbent comprises Mn(IV).

16. The method of claim 14, wherein the oxidized and native As(V) is adsorbed by

Fe oxide in said adsorbent and subsequently removed.

17. The method of claim 14, wherein the adsorption is performed at the pH range from about 4 to about 9.

18. The method of claim 14, wherein the resulting waters comprise less than 3 ppb of As(III) and/or As(V).

19. The method of claim 14, wherein said waters are ground waters or surface waters.

20. A filtration unit used for removing As(III) and As(V) from arsenic-contaminated waters, comprising:

a filter column with the adsorbent of claim 3.

21. The filtration unit of claim 20, wherein said adsorbent comprises 1% Fe oxide with Mn/(Mn+Fe) molar ratio of 0.10.

22. The filtration unit of claim 20, wherein the resulting waters comprise less than 3 ppb of As(III) and/or As(V).

23. The filtration unit of claim 20, wherein said waters are ground waters or surface waters.

24. A method of removing arsenic having various valence states from arsenic-contaminated waters, comprising the steps of:

(a) oxidizing the arsenic having lower valence states to arsenic having higher valence states in said arsenic-contaminated waters; and

(b) removing the oxidized and native arsenic having higher valence states from said

waters.

25. The method of claim 24, wherein said arsenic-contaminated waters comprise As(III) and As(V).

26. The method of claim 24, wherein said arsenic having lower valence states is oxidized by a Mn-containing oxide.

27. The method of claim 26, wherein said Mn-containing oxide is selected from the group consisting of birnessite, Si-birnessite, Mn-ferrihydrite and zeolite coated with nanophase Mn-Fe oxide.

28. The method of claim 24, wherein said oxidized and native arsenic having higher valence states is adsorbed and removed by a Mn-containing Fe oxide.

29. The method of claim 28, wherein said Mn-containing Fe oxide is selected from the group consisting of birnessite, Si-birnessite, Si-ferrhydrite, Mn-ferrihydrite and natural zeolite coated with nanophase Mn-Fe oxide.

30. The method of claim 28, wherein the adsorption is performed at the pH range from about 4 to about 9.

31. The method of claim 28, wherein the resulting waters comprise less than 3 ppb of As(III) and As(V).

32. The method of claim 28, wherein said waters are ground waters or surface waters.

33. A filtration unit used for removing As(III) and As(V) from arsenic-contaminated

waters, comprising:

a filter column with the adsorbent of claim 1.

34. The filtration unit of claim 33, wherein said waters are ground waters or surface waters.

35. The filtration unit of claim 33, wherein said filter is a single media filter or a dual-media filter.

36. The filtration unit of claim 35, wherein said dual-media filter contains first adsorbent in the upper side of the filter column and second adsorbent in the bottom side of the filter column.

37. The filtration unit of claim 36, wherein said first adsorbent oxidizes As(III) to As(V), said second adsorbent adsorbs the oxidized and native As(V).